WFHS AP CHEMISTRY SUMMER ASSIGNMENT

May 2019

Dear Prospective AP Chemistry Student,

Welcome to the start of a new journey! I hope you held on to your honors chemistry notebook!

In this course, you will be expected to put forth an amazing amount of effort in order to succeed. Not only will you be responsible for memorizing a lot of information, you will be expected to apply it to solve problems in many different ways, beyond the examples in your notes. AP Chemistry is not for the weak. Smart people who don't want to put in the effort and work hard could fail, and people who put in the work and effort but just don't get the chemistry (at this point in their lives…sometimes the frontal lobe needs to develop a little more fully) might have a hard time getting the grade they want. Chemistry is not always easy. But please understand that I expect you to try to learn the material. I try to do everything in my power to keep you from cheating. If you typically cheat or heavily rely on others to get by--you do you—but please save yourself the heartache and DO NOT take this class!

There are <u>three sets</u> of specific information on the following pages that should be <u>memorized</u> during the three weeks leading up to the start of the school year, working for an hour each day. You may start memorizing earlier than that, but be sure to give yourself a little bit of a vacation! ☺ We will practice the information on the first few days of class and you will be tested on it (strictly memorization; no application—this will come later!) on the fifth day.

I am excited to see what's in store for the AP chemistry class of 2019-2020!

Sincerely,
Mrs. Tara "Wojo" Wojciechowski ☺
Room 3621

p.s. Even though elements are listed first, polyatomic ions are probably most important to start learning earlier. They will be what you forget most easily if you don't drill them into your head.

p.p.s. In addition to the memorization, I would like you to also review your honors chemistry notes from unit 3 to help you complete the "mixed compounds review" at the end. Compounds will NOT be on the summer assignment test, but they will be offered for extra credit on the summer assignment test. Compounds will be a big part of the first actual AP Chem unit test (Chapters 1 & 2) and reviewing the rules for naming and forming their formulas now will definitely help you in the long run!

p.p.p. s. What are your reasons for taking AP Chemistry and what goals do you have for yourself? PLEASE email me the answers to these questions (twojciechowski@wcpss.net) to introduce yourself so that I have an idea who you are when you walk into the class! I don't like not knowing who you are!

☺ The "3" THINGS TO MEMORIZE BEFORE DAY 5 ☺

1. <u>All</u> Element Names and Symbols from the Continental (no lanthanides and actinides) Periodic Table. Know <u>metals</u> from <u>non-metals</u> and <u>family names</u> of groups 1, 2, 3-12, 16, 17, 18

A fun way to do this is (and learn how to spell them correctly!) is to do the periodic table quiz on Sporcle.com or learn the Asap science "New Periodic Table" song! Both the song and the Sporcle quiz include the lanthanides and actinides so you'll be even more prepared!

2. Names and Formulas of Polyatomic Ions

acetate CH_3COO^-

ammonium NH_4^+

bicarbonate HCO_3^-

biphosphate HPO_4^{2-}

bisulfate HSO_4^-

carbonate CO_3^{2-}

chlorate* ClO_3^-

chlorite* ClO_2^-

chromate CrO_4^{2-}

cyanide CN^-

dichromate $Cr_2O_7^{2-}$

dihydrogen phosphate $H_2PO_4^-$

dimercury (mercury I) Hg_2^{2+}

hydronium H_3O^+

hydroxide OH^-

hypochlorite $*ClO^-$

nitrate NO_3^-

nitrite NO_2^-

oxalate $C_2O_4^{2-}$

perchlorate $*ClO_4^-$

permanganate MnO_4^-

peroxide O_2^{2-}

phosphate PO_4^{3-}

phosphite PO_3^{3-}

sulfate SO_4^{2-}

sulfite SO_3^{2-}

thiocyanate SCN^-

thiosulfate $S_2O_3^{2-}$

* Any halogen can replace chlorine in this ion system
ex. BrO_3^- is called bromate, BrO_2^- is bromite

3. The Solubility Rules of Salts and the Strong Acids and Bases

Solubility Rules

Solubility Rules of Salts

A salt is an ionic compound that cannot be classified as an acid, a base, an oxide, or a hydride. These rules are used to predict which salts will dissociate (break apart into ions) in aqueous solution, thus being "soluble", and which salts will not, thus being "insoluble".

Note: "Insoluble" means it will not dissolve in water at concentrations of 0.1M or greater…because all salts have *some degree* of solubility.

1. All salts containing group 1 (alkali metal) cations (Li^+, Na^+, K^+, Cs^+, Rb^+) and the ammonium cation (NH_4^+) are soluble.
2. All nitrates (NO_3^-) are soluble.
3. All acetates (CH_3COO^-) are soluble.
4. All chlorates (ClO_3^-) and perchlorates (ClO_4^-) are soluble.
5. Chlorides (Cl^-), bromides (Br^-), and Iodides (I^-) are soluble EXCEPT those of silver, lead, or mercury I (Hg_2^{2+})

6. Sulfates (SO_4^{2-}) are soluble EXCEPT those of silver, lead, mercury (I), Ca, Sr, and Ba.

7. Sulfides (S^{2-}) are <u>insoluble</u> EXCEPT those of alkali metals, ammonium, calcium, strontium, and barium.

8. Phosphates (PO_4^{3-}), chromates (CrO_4^{2-}), dichromates ($Cr_2O_7^{2-}$), carbonates (CO_3^{2-}), and sulfites (SO_3^{2-}) are <u>insoluble</u> except those of alkali metals or ammonium.

Dissociation/Ionization of Acids (HX)

Acids will dissociate (or ionize) into H^+ and X^- if one of the 6 *strong acids (see below)*. All other acids (HX) are weak and should always be written in molecular form.

> **Special Note:** Carbonic acid (H_2CO_3) does not really exist; when produced in a reaction, it should always be written as $H_2O + CO_2$. Same with sulfurous acid (H_2SO_3), which should always be written as $H_2O + SO_2$.

<u>6 Strong Acids</u>: hydrochloric (HCl), hydrobromic (HBr), hydroiodic (HI), nitric (HNO_3), perchloric ($HClO_4$), sulfuric (H_2SO_4)

Dissociation of Arrhenius Bases (MOH)

Bases will dissociate (into M^+ and OH^-) only if one of the strong bases.

<u>Strong Bases</u>: Hydroxides of alkali metals and calcium, strontium, and barium. All other bases are weak and should always be written in molecular form.

> **Special Note:** Ammonium hydroxide does not really exist; when produced in a reaction, it should always be written as $H_2O + NH_3$.

Oxides (O^{2-})

Oxides do not dissociate; they chemically react with water to form acids (non-metallic oxides) or bases (metallic oxides). They are considered to be acidic or basic solutions of gases.

Hydrides (H^-) Metallic hydrides (**MH**, ex. LiH) do not dissociate; they chemically react with water to form bases and hydrogen gas.

EXTRA--Mixed Compounds Review

Write the correct chemical formulas for the following compounds:

1. Vanadium (V) oxide
2. Potassium oxide
3. Ammonium chloride
4. Lead (II) carbonate
5. Potassium chromate
6. Potassium bicarbonate
7. Silver acetate
8. Potassium cyanide
9. Magnesium chlorate
10. Carbon dioxide
11. Trisulfur decahydride
12. Butane
13. Cadmium chromate
14. Iron (III) chloride
15. Nitrogen dioxide
16. Tin (II) oxalate
17. Potassium dichromate
18. Aluminum sulfide
19. Boron trifluoride
20. Carbon tetrachloride
21. Beryllium oxide
22. Ammonium phosphite
23. Tetracarbon nonaiodide
24. Sodium cyanide
25. Potassium permanganate
26. Nonane
27. Tin (II) oxide
28. Lithium sulfide
29. Selenium hexachloride
30. Molybdenum (V) acetate
31. Ruthenium (VII) bromate
32. Chromium (VI) iodate
33. Niobium (IV) telluride
34. Phosphorus monosulfide
35. Gold (VI) perchlorate
36. Manganese (VII) bisulfate
37. Aluminum dihydrogen phosphate
38. Zinc biphosphate
39. Arsenic monoastatide
40. Nitrogen monoxide
41. Phosphorus dioxide
42. Magnesium hydroxide
43. Nickel (VII) thiocyanate
44. Mercury (I) peroxide
45. Xenon hexafluoride
46. Ammonium thiosulfate
47. Iron (III) oxide
48. Mercury (II) chromate